IN THE CLAIMS:

1. (Original) A packet processing apparatus for using connection-oriented and connectionless communication channels to perform communication, said packet processing apparatus comprising:

units for using the connectionless communication channel to perform data transfer;

judgment units for observing data transferred using the connectionless communication channel, and judging whether or not a data flow is continuous; and

units for changing the communication channel of the data flow over to connection-oriented data transfer when it is judged that said data flow is continuous for a predetermined time.

2. (Original) The packet processing apparatus according to claim 1, further comprising units for changing the data flow communication channel back to connectionless data transfer when said judgment units judges that said data flow is not continuous for the predetermined time.

3. (Original) The packet processing apparatus according to claim 2, for using asynchronous and isochronous communication channels to perform a processing of an IP packet, and using an IEEE 1394 serial bus to perform multimedia data transfer, said packet processing apparatus further comprising:

units for using the asynchronous communication channel to perform the data transfer with respect to the IP packet to be transmitted to another communication node during reception from another communication node, or in response to occurrence of a request of an application mounted on the packet processing apparatus itself; judgment units for periodically observing data transferred using the asynchronous communication channel, and judging whether or not the data flow is continuous for a fixed time; and

units for changing the data flow communication channel over to isochronous data transfer when it is judged that said data flow is continuous for the fixed time.

4. (Original) The packet processing apparatus according to claim 3, further comprising:

an ARP processor for performing an ARP processing;

an address table for storing information of the IP packet to be subjected to a transmission processing as entry information by the communication node by the ARP processing;

a transmission monitor for periodically observing a content of said address table, observing whether the data flow belonging to the packet subjected to the transmission processing is continued for the fixed time, and determining, in accordance with the observation result, whether or not an isochronous channel is to be established;

a CMP processor for setting the connection-oriented communication channel based on the information determined by the transmission monitor, and registering the communication channel information into said address table; and

an IEEE 1394 packet generator for judging, based on the information stored in the address table, whether the IP packet to be transmitted is generated as an isochronous packet or an asynchronous packet, and generating an IEEE 1394 packet.

5. (Canceled)

6. (Canceled)

7. (Original) The packet processing apparatus according to claim 6, further comprising:

an IEEE 1394 packet transmitter for transmitting the IEEE 1394 packet; an IEEE 1394 packet receiver for receiving the IEEE 1394 packet;

an IP packet extractor for extracting the IP packet from the received IEEE 1394 packet; an IP packet processor for referring to a routing table set/updated by the ARP

processing from the extracted IP packet, adding predetermined transfer destination information, and instructing encapsulation of the IP packet into the IEEE 1394 packet;

an address table for receiving a transmission processing notice from said IEEE 1394 packet transmitter, and including attribute information indicating presence/absence of continuous transmission of the IP packet as the entry;

a transmission monitor for searching the information of said address table at a fixed interval, and judging, in accordance with the searched information, whether establishment of an asynchronous channel is necessary or unnecessary with respect to the data flow;

a CMP processor for obtaining a corresponding isochronous channel number, and a band from an isochronous channel establishment request transmitted from said transmission monitor, and registering the obtained channel information into said address table; and

means for referring to the information of said address table to encapsulate the IP packet to be transmitted in the IEEE 1394 packet, and using said established communication channel to generate the isochronous packet.

8. (Original) The packet processing apparatus according to claim 7, further comprising:

units for extracting port information of the IP packet to be transmitted, and setting the information in the address table; and

units for judging whether a predetermined number of transmissions of the packet for entry information are continuously performed with respect to respective entries including the set port type in said address table.

9. (Original) A network constituted by connecting the packet processing apparatus according to claim 1.

10. (Original) A packet processing method for using connection-oriented and connectionless communication channels to perform a packet processing, said packet processing method comprising steps of:

using the connectionless communication channel to perform data transfer;

observing data transferred using said connectionless communication channel, and judging whether or not a data flow is continuous for a predetermined time; and

changing the communication channel of the data flow over to connection-oriented data transfer when it is judged that said data flow is continuous for the predetermined time.

11. (Original) The packet processing method according to claim 10, further comprising a change-back step of changing the data flow communication channel back to connectionless data transfer when said judgment step judges that said data flow is not continuously transmitted for the predetermined time.

12. (Original) The packet processing method according to claim 11 for using asynchronous and isochronous communication channels to perform a processing of an IP packet and using an IEEE 1394 serial bus to perform multimedia data transfer, said packet processing method further comprising steps of:

using the asynchronous communication channel to perform the data transfer with respect to the IP packet to be transmitted to another communication node during reception from another communication node, or in response to occurrence of a request of an application mounted on a self communication node;

periodically observing data transferred using the asynchronous communication channel, and judging whether or not the data flow is continuous for a fixed time; and

changing the data flow communication channel over to isochronous data transfer when it is judged that said data flow is continuous for the fixed time.

13. (Original) The packet processing method according to claim 12, further comprising:

a step of performing an ARP processing; and an address table registering step of registering packet information to be subjected to transmission by the ARP processing step;

a transmission monitor step of periodically observing a content of said address table, observing by said observing step whether the data flow belonging to the packet subjected to the transmission processing is continued for the fixed time, and determining, in accordance with the observation result, whether an isochronous channel is to be established;

a processing step or setting the connection-oriented communication channel based on the information determined by the transmission monitor step, and registering the communication channel information into said address table; and

a packet generating step of for judging, based on the information stored in the address table, whether the IP packet to be transmitted is generated as an isochronous packet or an asynchronous packet, and generating a packet.

14. (Original) The packet processing method according to claim 13, provided with a step of using asynchronous and isochronous communication channels to perform a processing of an IP packet, using an IEEE 1394 serial bus to perform multimedia data transfer, and

referring to a routing table for storing routing information of a network obtained by an ARP processing to transmit the IP packet to be transmitted to another communication node to a predetermined transfer destination, said packet processing method further comprising:

an IEEE 1394 packet generating step of determining, based on information stored in an address table, whether an isochronous packet or an asynchronous packet is to be generated, and generating an IEEE 1394 packet;

a registering step of registering the information obtained by performing the ARP processing as one entry in the routing table and the address table when the information of the IP packet to be transmitted is not registered in said address table;

a step of searching the address table at a predetermined time interval, and setting a packet flag indicating whether or not packet transmission is performed during searching of the address table, and a count value indicating the number of continuously observed transmissions of the packet belonging to the data flow; and

a transmission step of establishing a connection-oriented communication channel with respect to the data flow when it is judged, in accordance with the information of said address table, that the transmission of the packet belonging to the data flow is performed in the predetermined observation interval and the predetermined number of observed transmissions are continuously performed, and

using the established connection-oriented communication channel to encapsulate the IP packet in the corresponding connection-oriented IEEE 1394 packet and perform the transmission.

15. (Original) The packet processing method according to claim 13 wherein said transmission observing step comprises steps of:

initializing a packet flag of the address table to set to predetermined value every time the processing of searching the address table is performed at a predetermined time interval; and

initializing a counter value for the entry when the packet flag of the entry of said address table remains to be said value in the next search processing.

16. (Original) A packet processing apparatus for using connection-oriented and connectionless communication channels to perform communication, said packet processing apparatus comprising:

means for using the connectionless communication channel to perform data transfer;

judgment means for observing data transferred using the connectionless communication channel, and judging whether or not a data flow is continuous; and

means for changing the communication channel of the data flow over to connection-oriented data transfer when it is judged that said data flow is continuous for a predetermined time.

17. (Original) The packet processing apparatus according to claim 16, further comprising means for changing the data flow communication channel back to connectioniess data transfer when said judgment means judges that said data flow is not continuous for the predetermined time.

18. (Original) The packet processing apparatus according to claim 17 for using asynchronous and isochronous communication channels to perform a processing of an IP packet, and using an IEEE 1394 serial bus to perform multimedia data transfer, said packet processing apparatus further comprising:

means for using the asynchronous communication channel to perform the data transfer with respect to the IP packet to be transmitted to another communication node during reception from another communication node, or in response to occurrence of a request of an application mounted on a self communication node; judgment means for periodically observing data transferred using the asynchronous communication channel, and judging whether or not the data flow is continuous for a fixed time; and

means for changing the data flow communication channel over to isochronous data transfer when it is judged that said data flow is continuous for the fixed time.